

Duncan Tavares

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Subject: Arsenic Fact Sheet
Attachments: STown Manag14070211440.pdf

The attachment contains an **Arsenic Fact Sheet** that was prepared by the Florida Department of Health (DOH) specifically in response to the arsenic levels in the sand transferred from the Surf Club. I received a copy today from the Miami-Dade Health Department.

Significant information in the Florida Department Health Fact Sheet include:

- the background levels of arsenic in soils throughout the nation vary from 7 to 40 milligrams arsenic per kilogram (mg/kg). [Note: Town sampling of the sand revealed arsenic levels of 7.0; 7.8 and 8.9 mg/kg]
- DOH concludes that there is an extremely low risk of cancer health effects from the arsenic levels found in the transferred sand from the Surf Club
- Even at the most conservative (highest) lifetime exposure from the levels of arsenic in the transferred sand, the increased cancer risk posed from this exposure would be "essentially zero" when compared to the large background cancer rate.
- DOH does not expect non-cancer or short term health effects for children or adults from the levels of arsenic found. When compared to the daily safe dose for arsenic that is used to evaluate risk, the estimated exposure dose from the sand is well below the daily dose
- Addresses the question: "Is there a screening level for safe levels of arsenic on beaches?"

The above information is just a summary. Please read in detail the information provided by the Florida Department of Health as it specifically addresses issues discussed last night.



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Mission:

To protect, promote & improve the health of all people in Florida through integrated state, county & community efforts.

**Rick Scott**

Governor

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State Surgeon General & Secretary

Vision: To be the Healthiest State in the Nation

Arsenic Fact Sheet

What is the occurrence of arsenic in the environment?

Arsenic occurs naturally in soil and minerals. It may enter the air, water, and soil from wind-blown dust or from storm water runoff or leaching. Exposure can occur by breathing it in when it is in the air (inhalation), through eating or drinking it (ingestion), and through the skin (dermal absorption). However, most exposure to arsenic comes from ingestion rather than from breathing it in or touching it.

Soil and sand throughout the world contain levels of arsenic we can measure. Some areas of the US contain high natural levels in rock, which can lead to high levels of arsenic in soil or water. The background levels of arsenic in soil throughout the nation vary from 7 to 40 milligrams arsenic per kilogram soil (mg/kg). For instance, Kentucky has an average level of 9.4 mg/kg while Montana has one of 40 mg/kg. Local studies in Miami-Dade County on the barrier island beaches suggest the average background level in soil is 5.4 mg/kg but levels can be as high as 15.1 mg/kg. While arsenic levels in Florida soils are mostly lower than many states, the beach sand may have higher levels of it due to the nearby ocean. This is because ocean sediments can be greatly enriched in total arsenic. For many coastal areas, seaweed itself is rich in arsenic from the sediment. Therefore, seaweed is often used to improve or fertilize soil.

Do levels of arsenic at the Surf Club beach in Miami-Dade County pose a health risk?

To ensure the protection of public health, the Florida Department of Health (DOH) uses "worst-case" assumptions to estimate the risk of cancer. High-end estimates like these ensure that the actual chance of getting cancer from contact with arsenic will most likely be less than that. The level DOH considers "safe" is likely to overstate the actual human cancer risks. This level may even be zero.

The American Cancer Society says one in every two men and one in every three women in the United States will get cancer during their lifetime. Also, one in four men and one in five women will die from cancer. Cancer is the second leading cause of death in this country.

Based on beach sand testing of the Surf Club in Miami-Dade County results, DOH concludes that there is an extremely low increased risk of cancer health effects from the arsenic levels found. Even at the most conservative (highest) lifetime exposure from the levels of arsenic found on this beach, the increased cancer risk posed from this exposure would be "essentially zero" when compared to the large, background cancer rate.

Florida DOH does not expect non-cancer or short-term health effects for children or adults from the levels of arsenic found in Miami-Dade beach sands. When compared to the daily safe dose for arsenic that is used to evaluate risk, the estimated exposure dose from the sand is well below the daily dose.

Is there a screening level for safe levels of arsenic on beaches?

No. Toxicologists develop screening levels for chemicals based upon how people are most likely to come in contact with them in certain settings. Florida currently has developed cleanup target levels (a type of screening level) for soil for residential use and for industrial/commercial use. No such default

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cleanup level has been developed for visiting the beach because **exposure factors** (how often exposure occurs, how long it occurs, etc.) vary from person to person.

Toxicologists consider a number of factors to estimate risk. While the amount of chemical that someone contacts is important, exposure factors (defined above) will vary for each setting and for the health effect that is of interest. The health effects include whether a certain chemical poses a cancer risk or if it might be more apt to cause a non-cancer health effect. With cancer risks, toxicologists must base the screening levels for a typical resident on what most people are exposed to on a regular basis. For residential screening levels, this is often set at 350 days per year for a period of 30 years if someone lives somewhere for a lifetime (or 70 years). Non-cancer hazards are based upon a shorter exposure duration. These types of risk are based on less than a lifetime exposure (less than 70 years). People who go to the beach may have a shorter exposure duration than the 30 years assumed for the cancer risk of a lifetime resident. Other exposure factors will also be shorter. These shorter durations would produce proportionally less stringent (higher) acceptable arsenic levels for beach goers.

How does background concentration of arsenic factor into assessments?

Just because sampling shows that environmental contamination exists, that does not tell you where the chemicals came from. In some cases, the screening levels, which are purely risk-based estimates, will be lower than the levels that occur naturally in some areas. Understanding how these "background" levels that occur naturally in an area may contribute to those found in soil sampling is an important part of site-specific assessments.

Background levels of substances occur naturally (or are ambient) in the environment with no influence by humans (such as metals found in soils). Since the levels of arsenic found in the beach sand sampling are consistent with those at background, one can conclude that local sources have not significantly impacted the beach sand. Generally, agencies like the US Environmental Protection Agency (EPA) do not clean up below natural background levels.

Is there a medical test to show whether I have been exposed to arsenic?

Although there are tests to measure arsenic in urine, hair and fingernails, the results of these tests may be hard to interpret. They cannot predict whether the arsenic levels in someone's body will affect health. Tests of hair and fingernails can sometimes be used to measure exposure to very high levels of arsenic over the past several months. However, these tests are not always reliable because results may come from arsenic in dirt on the outside of the hair or nails rather than from what is actually in the body.

Your body naturally rids itself of arsenic, which is why it is found in hair, nails, and urine. A urine test can look for arsenic exposure only within the last several days. A urine test may also show arsenic if you are eating seafood which has organic arsenic. This organic form of arsenic is generally not considered harmful. If a urine test shows a high level of arsenic, you may need to change your diet and be tested again. Or, you can ask for a special test that tells which form (organic or inorganic) of arsenic is present. Again, organic arsenic, like in shellfish, is not harmful.

Is beach exposure the only source of arsenic?

Arsenic is also present in food and drinks. In general, the highest levels of total arsenic are found in food. They include both organic and inorganic forms of arsenic. Concentrations are highest in seafood, followed by meats and grain. Fruit, vegetables and dairy products tend to have lower total amounts. On the basis of available data, it is estimated the daily intake of total arsenic from the consumption of food and beverages in the general population typically lies between 20 and 300 micrograms of arsenic per day (ug/day). Of that, only a small fraction comes from ingestion of arsenic in soil.

Is the beach radioactive?

A background level of radiation exists in all environments. Background levels are produced from naturally occurring radiation that has been present since the formation of the earth. On average, Americans receive about 620 millirem (mrem) each year from all sources of ionizing radiation. Of that amount, 48 percent (300 mrem) comes from indoor radon as well as other indoor and outdoor natural radiation sources. It is impossible to completely avoid radiation exposure because of these background levels.

DOH performs beach sand sampling for radiation as part of routine surveillance. From this work, we find that beaches contain naturally occurring isotopes like Thorium-232 and Potassium-40. Levels are typical of background levels of radiation present in soil. In the U.S., there is also a large amount of radioactivity in the oceans, with Potassium-40 dominant in the ocean itself. Thorium-232 is the most often found type of isotope in the ocean sediments. Potassium-40 is also found in significant amounts in the human body, especially in muscles.

Why does the sand color look different?

Most efforts to rebuild beaches do not affect how the beach looks. However, sometimes the sand or soil brought in to rebuild a beach may be stained black or dark gray from organic matter, or brown from iron oxide. In most cases, the dark color goes away after 6 months to a year. At that point, it often cannot be distinguished from the native beach sand.